ABSTRACT:

In this study, a number of ternary mixture aqueous solutions of chitosan/agar/poly vinyl alcohol (CS/AG/PVA) at different proportions (considering chitosan as the main component) were prepared. The effects of temperature, shear rate, shearing time and storage time on the rheological properties, i.e., the apparent viscosity and the shear stress as a function of shear rate were investigated for the ternary system. Results showed that a Newtonian behavior was observed at temperatures from 40 o C to 55 o C for the ratios 90/05/05 and 80/10/10. The mixture solutions become pseudoplastic (shear thinning) when the concentrations of agar and PVA were higher than 10 % each. It was also found that all the blend solutions obeyed the Arrhenius equation. In addition, the effect of the shearing time on the shearing viscosity did not show any significant change at all shearing times applied for lower concentrations than 15% of each of agar and PVA in this study. However, at higher concentrations of agar and PVA, a rheopectic behavior was observed. Furthermore, different behaviors were observed for the blend solutions when the period of storage was extended to three weeks. The observations obtained from the rheological measurement suggested the existence of interaction between the three polymers. Finally, the morphology of the blended films confirmed the interaction between the functional groups of the blend components.